UNITED STATES PATENT APPLICATION

OF

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FOR

WASHING MACHINE CONTROL METHOD AND

WASHING MACHINE USING THE SAME

[0001] This application claims the benefit of Korean Application No. 10-2002-0073602 filed on November 25, 2002, which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

5 <u>Field of the Invention</u>

[0002] The present invention relates to a washing machine, and more particularly, to a washing machine control method and washing machine using the same, utilizing a memory function to enable the setting of a customized parameters for each of a plurality of courses.

<u>Discussion of the Related Art</u>

10 [0003] A washing machine is an apparatus for removing dirt from laundry through such steps as washing, rinsing, and dewatering in accordance with a stored program executed by a microcomputer. Generally, a washing machine is provided with a variety of control features for selecting the desired parameters for running the program. One among such features is a memory feature enabling a user to set the conditions for a custom course for

15 performing washing, rinsing, and dewatering steps as desired. The memory feature is specifically designed to accommodate the user's most frequently used washing machine settings.

[0004] Referring to FIG. 1, a washing machine according to a related art is comprised of a key input unit 10 for selecting and inputting user commands, including commands for

20 course selection and course parameter control; a memory 20 for storing preset (default) parameters for performing each of a plurality of courses and for storing user-determined parameters for performing a memory course according to a memory function; a display 30 for displaying the parameters as stored in or to be stored in the memory; and a microcomputer 40 for controlling the parameters as displayed, according to the input user commands and a

program stored in the memory, and for executing the courses as selected. In the absence of a specific selection of course parameter control, the microcomputer executes the courses according to default parameters stored in the memory 20. A set of default parameters is stored for each course of the key input unit 10.

[0005] The key input unit 10 includes a course control device 11 for inputting a selection of one among a plurality of courses and a parameter control panel 12 for inputting a selection of course parameters, based on the setting of the course control device, using a plurality of parameter keys. For example, by repeatedly pressing a parameter key, the selected function may shift through a predetermined set of parameters for adapting such parameters as washing time, water temperature, and the number of rinsing and dewatering cycles to be performed.

[0006] The course control device 11 may be realized as a rotary switch (not shown) for selecting among a plurality of course settings. The selections of the course control device 11 may, for example, include for a "normal" course, a "synthetics" course, a "wool" course, a "blanket" course, a "speed" course, and a "memory" course among others. Here, it should be noted that the memory course is selected in lieu of any of the other courses. Also, though not shown in the drawings, the course control device 11 operates in conjunction with a course execution key, such as a start/pause button, for initiating the execution of the selected course.

[0007] In the operation of the memory function of the above washing machine according to the related art, the user first adjusts the rotary switch to select the memory course among the plurality of course settings of the course control device 11 and then inputs a custom parameter selection using the parameter keys of the parameter control panel 12. In doing so, the microcomputer 40 first recognizes the settings of the memory course and then

stores the settings of the custom parameter selection in the memory 20. At the time of execution, the user operates the key input unit 10 to select the desired course for execution and presses the start button, whereupon the microcomputer 40 accesses the default conditions corresponding to the selected course and executes the selected course.

[0008]   FIG. 2 illustrates a washing machine control method, and specifically, a method of selecting and executing a desired washing course in the above-constructed washing machine according to a related art.

[0009]   Referring to FIG. 2, it is first determined whether the memory course has been selected (in a step S20) or whether another course has been selected (in a step S24). If the memory course is selected, the parameters of the memory course are read from the memory 20 and displayed on the display 30. Here, the displayed parameters are those currently stored in the memory 20 and may be the default parameters of the memory course or a set of customized parameters as selected by the user. In any event, the memory course parameters are determined in accordance with a step S21 described later. Meanwhile, if a course other than the memory course is selected, the default parameters corresponding to the selected course are read from the memory 20 and displayed on the display 30 in a step S25. With the course parameters thus displayed, it is determined in a step S22 whether the start button is pushed, and if so, the selected course as displayed is executed in a step S23 according to the stored parameters.

[0010]   The step 21 is for determining the parameters of the memory course, that is, for selecting and storing a customized set of course conditions for execution in the step S23 if the memory course is selected and the start button is pushed.

[0011]   Referring again to FIG. 2, and assuming that the memory course has been selected by operating the course control device 11 to select the memory course from a

plurality of courses, the current parameters of the memory course, as stored in and read from the memory 20, are displayed on the display 30 in a step S21a. Here, it should be appreciated that the displayed parameters are either a set of default parameters or a set of parameters previously selected by the user. That is, if no memory course parameters have been stored, the default parameters are displayed, which are typically synonymous with those of one of the above-mentioned courses of the course control device 11, for example, the "normal" course.

[0012] With the current parameters thus displayed, it is determined in a step S21b whether a key input from the parameter control panel 12 is present, indicating the user's desire to set the displayed parameters or to change those already set during a previous operation, and the parameters are displayed accordingly in a step S21c. To save the settings as selected in steps S21b and S21c, the user then operates a "save" function of the key put unit 10, which is typically achieved by merely proceeding to the next step, for example, by pushing the start button. If it is determined in a step S21d that the save function is desired, the parameters as displayed are stored in a step S21e as the current operating parameters of the memory course.

[0013] In the washing machine of the related art as above, however, the memory course is simply one among a plurality of courses, to be selected by the user for execution with or without customizing its parameters. Thus, to operate the washing machine according to the memory course, or to change the settings of the memory course itself, a rotary switch or similar means must first be manipulated, which is inconvenient to users. Moreover, the memory course is merely an optional standard course, i.e., a course with or without changes to the default parameters of the standard course. Hence, the function of the memory course is limited.

SUMMARY OF THE INVENTION

[0014]   Accordingly, the present invention is directed to a washing machine control method and washing machine using the same that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

[0015]   An object of the present invention, which has been devised to solve the foregoing problem, lies in providing a washing machine control method and washing machine using the same, which enables the user to define a customized set of parameters to achieve a memory function for each of a plurality of courses, to enhance user convenience and to increase the overall flexibility and capability of a memory feature as well as the washing machine itself.

[0016]   Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent to those having ordinary skill in the art upon examination of the following or may be learned from a practice of the invention.   The objectives and other advantages of the invention will be realized and attained by the subject matter particularly pointed out in the specification and claims hereof as well as in the appended drawings.

To achieve these objects and other advantages in accordance with the present invention, as embodied and broadly described herein, there is provided a method of controlling a washing machine having a memory function using memory means and having course start input means for selectively performing one of a plurality of courses.   The method comprises steps of establishing a set of customized parameters for performing each of the plurality of courses; first selecting one of the plurality of courses for execution, the selected course corresponding to one of the set of parameters established in the establishing step; displaying default parameters of the course selected in the first selecting step; clearing

the displayed default parameters and displaying, in response to a first selection of the memory function, the customized parameters corresponding to the course selected in the selecting step; and performing, upon an input of the course start means, the selected course according to the displayed parameters. The establishing step is comprised of steps of second selecting, from a predetermined set of parameters, the customized parameters for display; and storing in the memory means the customized parameters selected in the second selecting step in response to a second selection of the memory function.

In another aspect of the present invention, there is provided a washing machine having a memory function using memory means and having course start input means for selectively performing one of a plurality of courses in accordance with a program. The washing machine comprises key input means for selecting one of the plurality of courses and for determining a set of customized parameters for each course, the key input means having setting up setup conditions of the selected cycle course, the key input unit inputting whether to store the setup conditions; memory means for respectively storing a set of default parameters for each course and for respectively storing, in response to a user operation of the key input means, the customized parameters of each course; display means for displaying the parameters of each course, according to a user operation of the key input means; and a microcomputer for controlling the display of parameters stored in the memory means according to a user operation of the key input means. The key input means comprises a course control device for selecting the course; a plurality of parameter keys for determining the customized parameters according to an operation of the course control device; and a memory key for enabling an operation of the plurality of parameter keys and for enabling the storing in the memory means the customized parameters of each course.

[0017]   It is to be understood that both the foregoing explanation and the following

detailed description of the present invention are exemplary and illustrative and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]   The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention.   In the drawings:

[0019]   FIG. 1 is a block diagram of a washing machine according to a related art;

[0020]   FIG. 2 is a flowchart of a method for the course control of a washing machine according to a related art, specifically including a step of setting up and operating a memory course;

[0021]   FIG. 3 is a block diagram of a washing machine according to the present invention;

[0022]   FIG. 4 is a flowchart of a method of setting up and operating a memory function according to the present invention; and

[0023]   FIG. 5 is a flowchart of a washing machine control method according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0024]   Reference will now be made in detail to the preferred embodiment of the present invention, examples of which are illustrated in the accompanying drawings. Throughout the drawings, like elements are indicated using the same or similar reference designations where possible.

[0025]   Referring to FIG. 3, a washing machine according to the present invention is comprised of a key input unit 100 for selecting and inputting user commands, including commands for course selection and course parameter control, a memory 200 for storing preset parameters for performing each of a plurality of courses and for storing user-determined parameters for performing a memory course according to a memory function, a display 300 for displaying the parameters as stored in or to be stored in the memory, and a microcomputer 400 for controlling the parameters as displayed, according to the input user commands and a program stored in a memory, and for executing the courses as selected.   In the absence of a specific selection for course parameter control, the microcomputer executes the courses according to default parameters stored in the memory 200.   A set of default parameters is stored for each course of the key input unit 100.

[0026]   The key input unit 100 includes a course control device 110 for inputting a selection of one among a plurality of courses and a parameter control panel 120 for inputting a selection of course parameters, based on the setting of the course control device, using a plurality of parameter keys.   For example, by repeatedly pressing a parameter key, the selected function may shift through a predetermined set of parameters for adapting such parameters as washing time, water temperature, and the number of rinsing and dewatering cycles to be performed.

[0027]   As in the case of the washing machine of the related art, the course control device 110 may be realized as a rotary switch (not shown) for selecting among a plurality of course settings.   The selections of the course control device 110, however, include no separate setting for a "memory" course.   In addition, the key input unit 100 of the present invention includes a memory key 130 for specifically saving parameters for any of the courses selectable via the course control device 110, as set by a user operation of the parameter

control panel 120 or based on parameters read from the memory 200. Also, though not shown in the drawings, the course control device 110 operates in conjunction with a course execution key, such as a start/pause button, for initiating the execution of the selected course.

[0028]   In the operation of the washing machine according to the present invention, the user may select one of a plurality of courses through the course control device 110 of the key input unit 100, to cause the default parameters of the selected course to be displayed. That is, the microcomputer 400 recognizes the selection and then reads from the memory 200 the default parameters corresponding to the selected course for display through the display 300. The selection of a memory function via the memory key 130, however, results in the microcomputer 400 clearing the displayed default parameters, whereupon the current parameters of the selected course are read from the memory 200 and displayed in their stead. The current parameters may then be set by the user or may have been previously set, taking the default parameters of the selected course as a reference.

[0029]   To set the current parameters of a given course, the user operates the parameter control panel 120 after pressing the memory key 130, to change the displayed parameters.   Once a parameter selection is determined, and is visually confirmed through the display 300, the memory key 130 is pressed and held for a predetermined time period, say, three seconds, which saves in the memory 200 the thus changed parameters as displayed. This predetermined time is in contrast to a relatively short time for the above selection of the memory function.   Also, the saving of the displayed parameters may be confirmed to the user through, for example, an audible signal such as a beep or a visual signal such as a change in the status of an illumination means.

[0030]   Accordingly, the microcomputer 400 may recognize a customized set of parameters for each course of the course control device 110, each set of parameters being

respectively stored in the memory 200 for selective access and recall through a subsequent user manipulation of the course control device followed by a pressing of the memory key 130. Thereafter, an operation of the start/pause button (not shown) initiates the course as displayed.

[0031]   FIG. 4 is a flowchart of a method of setting up and operating a memory function according to the present invention, the steps of which are executed by the microcomputer 400 in accordance with a stored program.   Here, it should be appreciated that the memory function is selectable and definable for each of a plurality of courses, so that each course may be executed using its default parameters or a customized set of parameters as defined through the method of FIG. 4.

[0032]   Referring to FIG. 4, it is first determined in a step S100 whether one of a plurality of courses has been selected through the course control device 110.   If none of the courses are selected, the program returns.

[0033]   In a step 110, the current parameters of the selected course, as stored in and read from the memory 200, are displayed on the display 300.   Here, it should be appreciated that the displayed parameters are either a set of default parameters or a set of parameters previously selected by the user.   That is, if no customized parameters have been stored for the selected course, its default parameters are displayed.

[0034]   It is then determined in a step S120 whether there is an input via the parameter control panel 120, which indicates the user's desire to change the displayed parameter settings of the selected course.   If so, the displayed parameter settings are changed in a step S130 according to the key input.   With the parameters thus set and displayed, it is determined in a step S140 whether there is an appropriate input via the memory key 130, which indicates the user's desire to save as displayed the parameter settings of the selected course.   If so, the parameter settings of the selected course are saved in a step S150 as set and displayed in the

steps S100-S130.

[0035] As described above, the steps of FIG. 4 may be repeated as desired for any one of the plurality of course selections provided by the course control device 110. Meanwhile, as shown in FIG. 8, illustrating a washing machine control method according to the present invention, the selection and execution of any course is achieved through the program executed by the microcomputer 400.

[0036] Referring to FIG. 8, it is first determined in a step S200 whether one of the courses of the course control device 110 is selected. In a step S210, the default parameters of the selected course are displayed on the display 300. With default parameters thus displayed, if the start/pause button is pushed in a step S260, the selected course is performed in a step S250 according to its default parameters. If none of the courses are selected, the program returns.

[0037] On the other hand, if it is determined in a step S220 that the memory key 130 has been pressed and held for a predetermined time, the displayed default conditions of the selected course are deleted in a step S230, whereby the current parameters of the selected course are read from the memory 200 and displayed on the display 300. Here, the current parameters are determined by the method of FIG. 4. With default parameters thus displayed, if the start/pause button is pushed in a step S240, the selected course is performed in the step S250 according to its customized parameters.

[0038] Therefore, the present invention enables the user to set for execution the course parameters for each of a plurality of courses, as desired, in addition to executing each course according to its default parameters.

[0039] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of

the invention.   Thus, it is intended that the present invention cover such modifications and variations, provided they come within the scope of the appended claims and their equivalents.